PLATO within the Scientific Programme of ESA

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Plan of the talk

• A few hints on the ESA Scientific Programme
• PLATO in the ESA science programme
• The future
ESA'S FLEET IN THE SOLAR SYSTEM

The Solar System is a natural laboratory that allows scientists to explore the nature of the Sun, the planets and their moons, as well as comets and asteroids. ESA's missions have transformed our view of the celestial neighbourhood, visiting Mars, Venus, and Saturn's moon Titan, and providing new insight into how the Sun interacts with Earth and its neighbours. The Solar System is the result of 4.5 billion years of formation and evolution. Studying how it appears now allows us to unlock the mysteries of its past and to predict how the various bodies will change in the future.
Science-driven
both long-term science planning and mission calls are bottom-up processes, relying on broad community input and peer review.

Mandatory
all member states contribute pro-rata to GNP providing budget stability, allowing long-term planning of its scientific goals and being the backbone of the Agency.
SCIENCE & ROBOTIC EXPLORATION

- **ESA Science Programme** covers astronomy, solar system science and fundamental physics.

- The general model is that ESA funding is used for the spacecraft, launcher and spacecraft operations, while the member states directly fund the payloads and parts of the science operations.

- We “study” multiple mission concepts until one is selected for development. We “build” that mission and then “operate” the mission in order to harvest the science. These are the three pillars of the Science Programme.
Mission on gravitational waves

1. High innovation content
2. European flagships
3. 3 per 20 years
The building blocks of the programme include:

a. **L-missions**, large European led flagship missions with a cost to ESA of around 2 annual budgets, one every 7-8 years. L1 is **JUICE** (2022), L2 is **Athena** (2028) and L3 (2034) a gravitational waves mission.

b. **M-missions**, provide the programme with flexibility. ESA led or implemented through international collaboration. Cost to ESA of around one annual budget, one every 3-4 years. M1 is **Solar Orbiter**, M2 is **Euclid**, M3 is **PLATO**. The **M4 call is now open**.

c. **S-missions**, new concept allowing national agencies to play a leading role in missions, 0.1 annual budgets, one every 4 years, potentially. S1 is **CHEOPS**.

d. **O-missions**, which are “missions of opportunity”, led by other agencies, small contributions.
COSMIC VISION
Steps 1 & 2

- Selection of Solar Orbiter as M1 and Euclid as M2 in 2011
- Selection of JUICE as L1 in 2012
- Selection of CHEOPS as S1 in 2012
- Selection of PLATO in early 2014 as M3
- Selection of ATHENA in June 2014 as L2
1. **LISA Pathfinder** (2015) testing technologies for gravity wave detection

2. **BepiColombo** (2016) a satellite duo exploring Mercury (with JAXA)

3. **Cheops** (2017) studying exoplanets around nearby bright stars

4. **Solar Orbiter** (2017) studying the Sun from close range
5. **James Webb Space Telescope** (2018) studying the very distant Universe (with NASA/CSA)

6. **Euclid** (2020) probing ‘dark matter’, ‘dark energy’ and the expanding Universe

7. **JUICE** (2022) studying the ocean-bearing moons around Jupiter

8. **PLATO** (2024) search for planets orbiting alien stars

9. **Athena** (2028) studying “The hot and energetic Universe” by an X-ray observatory
COSMIC VISION TIMELINE

L-Class
- JUICE
- eLISA
- ATHENA

S-Class
- CHEOPS

M-Class
- Euclid
- PLATO
- Solar Orbiter

- EChO
- LOFT
- MarcoPolo-R
- STE-QUEST
- PLATO

- M1/M2 down-selection
- M1/M2 selection
- M3 selection
- M4 Call
- CHEOPS (S1) launch 2017
- Solar Orbiter (M1) launch 2017
- Euclid (M2) launch 2020
- PLATO launch <2024
COSMIC VISION
A bottom-up approach

ESA Executive DG, D/SRE
Science Programme Committee

Advice Recommendations

Space Science Advisory Committee

Solar System and Exploration Working Group
Astronomy Working Group
Fundamental Physics Working Group

European Scientific Community

National Agencies

Scientists

L. Colangeli | ESA SRE | PLATO Science Conference | 3 December 2014
CALL FOR A MEDIUM-SIZE MISSION OPPORTUNITY IN ESA'S SCIENCE PROGRAMME FOR A LAUNCH IN 2025 (M4)

19 August 2014

Through this Call for Missions the Director of Science and Robotic Exploration solicits from the broad scientific community proposals for the competitive selection of mission concepts to be candidates for the implementation of a medium-size, or M-class, mission (M4) for launch in 2025.

Direct link to this Call page:
http://sci.esa.int/2014_M4_Call

Interested parties planning to submit a proposal are requested, as indicated below, to send a Letter of Intent by 16 September and will be invited to attend a briefing meeting on 26 September (date TBC).

The present Call is open to proposals for both European-only missions and missions in collaboration with international partners.

The selected mission will be implemented in the framework of ESA's Cosmic Vision Plan. The proposals submitted in response to the current Call can cover any science theme and topic of relevance to the Cosmic Vision Plan. These science themes and topics are laid out in the ESA brochure "ESA BR-247: Cosmic Vision - Space Science for Europe 2015-2025", which is linked from the right-hand menu.

The schedule for the issue of the Call and the proposal evaluation process is:

<table>
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<tr>
<th>Event</th>
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<tr>
<td>Release of Call for M4 mission</td>
<td>19 August 2014</td>
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<tr>
<td>Letter of Intent submission deadline</td>
<td>16 September 2014, 12:00 (noon) CEST</td>
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<tr>
<td>Briefing meeting (ESTEC)</td>
<td>26 September 2014 (TBC)</td>
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<tr>
<td>Proposal submission deadline</td>
<td>15 January 2015, 12:00 (noon) CET</td>
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<tr>
<td>Selection of missions for study</td>
<td>March 2015</td>
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2ND WORKSHOP ON PLANNING FOR A JOINT SCIENTIFIC SPACE MISSION - AN INITIATIVE OF THE EUROPEAN SPACE AGENCY AND THE CHINESE ACADEMY OF SCIENCES

2nd Workshop
Planning for a joint scientific space mission
Chinese Academy of Sciences (CAS) - European Space Agency (ESA)
Copenhagen (Denmark)
23-24 September 2014

http://sci.esa.int/esa-cas-workshop
http://jm.nssc.ac.cn
PLATO Project status overview

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1. Following mission selection, a PLATO Definition Study (phase B1) was initiated

2. Objectives:
   a. Establish a consolidated mission design (spacecraft, payload, ground segment) that meets the mission objectives
   b. Establish a development plan compatible with the mission implementation schedule, payload development and schedule risk analyses
   c. Prepare for the Implementation phase
ESA (Study Manager: Philippe Gondoin)
- Mission requirements and design
- Satellite: Three Industrial parallel studies
- Mission Operations
- Science Ground Segment: Science Operations Centre

PLATO Mission Consortium (PI: H. Rauer, DLR) funded by National Agencies
- Payload
- Science Ground Segment: PLATO Data Centre
- Science Preparation Management
1. Definition Study preparation start: March 2014
2. PLATO Mission Consortium kick-off: July 2014
3. ESA Phase B1 industrial studies kick-off: October 2014
4. Science Management Plan submission to SPC: June 2015
7. PLATO Definition Study Report: March/April 2016
For the Definition Study, ESA has appointed a PLATO Science Advisory Team with the following tasks:

- Provide scientific oversight in the fields of exoplanets, stellar physics, and complementary science
- Review and propose updates to the mission scientific requirements and assess the scientific performance
- Assist in making any top-level trade-offs
- Monitor the organisation of the ground based follow-up observing programme
- Act as a focus for the interests of the broad scientific community
1. The PLATO-SAT is chaired by the ESA Study Scientist, Ana Heras
2. PLATO-SAT members:
   - Heike Rauer (DLR, DE)
   - Conny Aerts (KUL, BE)
   - Magali Deleuil (LAM, FR)
   - Laurent Gizon (MPS, DE)
   - Marie-Jo Goupil (Obs. Paris, FR)
   - J. Miguel Mas-Hesse (CAB, ES)
   - Giampaolo Piotto (U. Padova, IT)
   - Don Pollacco (U. Warwick, UK)
   - Roberto Ragazzoni (INAF, IT)
   - Stephane Udry (U. Genève, CH)
3. The PLATO-SAT and the study activities are supported by the Senior Advisor (Göran Pilbratt)
Giotto
Target: 67P/Churyumov-Gerasimenko

Mass $\sim 10^{13}$ kg
Volume $\sim 25$ km$^3$
Density $\sim 0.4$g/cm$^3$
Rotation $\sim 12.4$ hour
The most intense ESA science operations ever
Arrival at comet
Lander deployment
Perihelion
Nominal end-of-mission

Summer 2014
12 November 2014
August 2015
December 31, 2015

http://blogs.esa.int/rosetta/